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10/662,536	09/15/2003	Jean Joseph Botti	DP-300006	2268

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DELPHI TECHNOLOGIES, INC.  
M/C 480-410-202  
PO BOX 5052  
TROY, MI 48007

EXAMINER
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FISCHMANN, BRYAN R

ART UNIT	PAPER NUMBER
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3618

DATE MAILED: 05/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/662,536

Applicant(s)

BOTTI ET AL.

Examiner

Bryan Fischmann

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 10 March 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-25 is/are pending in the application.
- 4a) Of the above claim(s) 18-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 7, 8, 10-13, 15 and 16 is/are rejected.
- 7) ☒ Claim(s) 5, 6, 9, 14 and 17 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### ***Acknowledgments***

1. The amendment filed 03-10-2005 has been entered.

The above amendment was considered to not be completely responsive and not completely in accordance with 37 CFR 1.121 for reasons discussed below in the "Election" and/or "Examiner's Comments" portion of the Office Action.

### ***Election***

2. The restriction requirement dated 08-11-2004 required an election between three species. In response, Applicant elected to prosecute Species II, Subspecies I (Figures 1, 3 and 5). Applicant identified all claims (1-25) as reading on the elected species.

As noted on the last Office Action dated 11-10-2004, the Examiner disagrees that claim 18 "reads" on the elected species, as claim 18 is drawn toward a free piston gas generator, which is associated with non-elected Species I. Due to this, claim 18 is withdrawn from consideration.

Note that claims 19-21 are also withdrawn from consideration, as they depend from claim 18.

The Examiner also disagrees that claim 22 reads on the elected species, as claim 22 is drawn toward a turbo-generator system, which is associated with non-elected Species III. Due to this, claim 22 is withdrawn from consideration.

Note that claims 23-25 are also withdrawn from consideration, as they depend from claim 22.

Accordingly, in summary, claims 18-25 are withdrawn from consideration, as being drawn toward a non-elected species. Applicant is requested to either cancel the

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withdrawn claims, or, when applicable, to make the claims depend upon an allowable generic claim.

Accordingly the "status identifier" for claims 18-25 on the above amendment should have read "(withdrawn)", as opposed to "(original)".

3. Regarding the above election and as also noted in the last Office Action, because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement in the election dated 09-13-2004, the election has been treated as an election without traverse (MPEP § 818.03(a)).

4. While the Applicant discussed claims 18-25 on pages 11 and 12 of the "Remarks" portion of the above amendment, this "discussion" was, as best understood, never explicitly related to a "traversal" of claims 18-25 not reading on the elected species. The remarks concerning claims 18-25 mentioned above is believed to be related to the drawing objection to Figure 4 in the last Office Action. Accordingly, the restriction requirement is still deemed proper and is therefore made FINAL.

5. An action on the merits of elected Species II, Subspecies I, claims 1-17 follows.

### ***Specification***

6. The abstract of the disclosure is objected to because of the following:

A) It is requested that Applicant identify the meaning of the abbreviation "SOFC" recited in the abstract.

7. The disclosure is objected to because of the following:

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A) It is requested Applicant update the status of allowed patent application 10/387,663 when the patent number is available. Also, it is requested that Applicant not include the attorney docket number of the Application in the disclosure, as this is not believed to be of any interest to the general public and may lead to confusion.

### ***Drawings***

8. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign not mentioned in the description: 121. Correction is required.

9. The drawings are objected to, as it is considered unclear how Figures 2-6 relate to Figure 1. Specifically, Figures 2-6 are best understood to be located within Figure 1, although it is not clear where on Figure 1 the structure of Figures 2-6 is located. As noted above, in some instances, the structure shown on Figures 2-6 is believed to replace engine 30, while in other instances, the structure shown on Figures 2-6 is believed to be used in "conjunction" with engine 30.

Also, regarding Figure 4, although Figure 4 shares common structure (57) with Figure 1, Figure 4 is described on page 11 as providing a "hydrogen rich exhaust" from reference number 410 on Figure 4. As best understood, this "hydrogen rich exhaust" would then be fed into the inlet of the fuel cell. However, Figure 4 shows that reference number 410 is directly upstream of reference number 57, which is also shown on Figure 1. However, comparison of Figures 1 and 4 show that reference number 57 is "downstream" of the fuel cell 40, which would mean that reference number 410 would

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also be "downstream" of the fuel cell, since Figure 4 shows no other components between reference numbers 57 and 410. This leaves unclear the purpose of producing a hydrogen rich gas stream downstream of a fuel cell that is then fed only through a heat exchanger (57).

10. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the following must be shown or the feature canceled from the claim. No new matter should be entered.

Claims 10 and 11 - a rich homogenous charge compression ignition

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

11. The drawing correction dated 3-10-2005 in which the words "/HCCI ENGINE" was added to "block 30" is not approved, as this implies block 30 as it now "reads" on Figure 1 is either an "engine reformer", "gas generator", "energy conversion device" or an "HCCI engine". As best understood from lines 1-3 of page 10, reference number 30 can be configured as any of the embodiments of Figures 2-4 and that the HCCI is an "electrical ignition" associated with Figure 2. This also leaves unclear why the abbreviation "HCCI", as noted above is best understood to be an "electrical ignition" is associated with the word "engine" as noted above.

From this, it would seem to be most clear if block 30 of Figure 1 "listed" the embodiments of Figures 2-4, and also including the "engine" of Figure 1, and that the

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HCCI were shown on Figure 2. Again note, as mentioned above, that there seems to be some confusion where Figure 4 is actually located in Figure 1. Also, adding the HCCI in Figure 2 at a specific location may result in a new matter objection, unless support can be found for this HCCI location in the original disclosure. Regarding Figures 5 and 6, these Figures are best understood to be "oxygen enrichment devices" that may optionally be used with the embodiments of Figures 2-4, particularly Figure 3. Applicant may want to consider showing these devices "upstream" of reference number 30 in Figure 1 for clarity.

### ***Claim Objections***

12. Claims 1-17 are objected to due to the following:

A) Claim 1 recites "...said extended rich mode engine configured to operate extremely rich of stoichiometric to produce a substantially continuous optimized hydrogen rich exhaust.

The phrase "extremely rich of stoichiometric" in the above recitation is objected to due to the following:

The phrase "extremely rich of stoichiometric" implies an air/fuel mixture that is "well-beyond" the stoichiometric air/fuel mixture. However, the latter portion of the above recitation recites "a...optimized hydrogen rich exhaust". Note that any air/fuel mixture that is "richer" than stoichiometric will produce a hydrogen exhaust, including air fuel mixtures that are not "extremely rich". Note also that lines 8 and 9 of page 9 of the specification recites "The present system and method optimizes (increases) the

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hydrogen content of the engine exhaust". From this, the word "optimizes" merely means any increase in the hydrogen content of an exhaust above stoichiometric. Due to this, the "first portion" of the above recitation is considered "contradictory" to the "second portion" and is therefore objected to.

B) Amended claim 11 recites "...where said engine is configure with...".

This recitation is objected to as being grammatically incorrect.

### ***Claim Rejections - 35 USC 112***

13. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

14. Claims 10 and 11 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention due to the following:

A) Claim 10 recites "An extended rich mode internal combustion engine as in claim 7, further comprising a rich homogenous charge compression ignition". Claim 11 contains a similar recitation.

On page 10, the Applicant refers to SAE Paper No. 98FL-486 entitled "Homogenous Charge Compression Ignition with a Free Piston...". Due to this,

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Applicant appears to disclose details of a "homogenous charge compression ignition" in the above SAE paper, which was incorporated by reference.

As noted, a SAE paper cannot be incorporated by reference, if it contains "essential material" to the disclosure. It would appear that the SAE paper contains "essential material", since material relative to a homogenous charge compression ignition is being claimed.

Since the SAE paper cannot be incorporated by reference since it contains "essential material", the disclosure lacks adequate written description of a homogenous charge compression ignition.

15. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

16. Claims 10 and 11 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicants regard as their invention.

A) Since claims 10 and 11 rely on "essential material" from an SAE paper that is improperly incorporated by reference, since, as noted, this SAE paper contains "essential material", the structure and meaning of the term homogenous charge compression ignition is considered unclear.

B) Also regarding claim 11, note that claim 11 recites "...comprising an oxygen enrichment device, a rich homogenous charge compression ignition, an optional dilute cylinder system...and combinations thereof".

This recitation leaves unclear whether Applicant is claiming some, or all of the components listed above. Specifically, since all of the components above are already

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recited at the beginning of the above recitation, it is then considered unclear what is meant by "combinations thereof" at the end of the above recitation.

***Claim Rejections - 35 USC 102***

17. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

18. Claims 1, 4, 7, 8, 10, 15 and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Rae, US Patent 3,040,519.

Rae teaches an extended rich mode engine having an intake and an exhaust, said extended rich mode engine configured to operate extremely rich of stoichiometric to produce a substantially continuous optimized (see comments below) hydrogen rich engine exhaust (see claim 6 and the claim objection to claim 1).

Regarding the term "optimized" in recited in claim 1, note also that lines 8 and 9 of page 9 of the specification recites "The present system and method optimizes (increases) the hydrogen content of the engine exhaust". From this, the word "optimizes" merely means any increase in the hydrogen content of an exhaust above stoichiometric. Note this is consistent with a "hydrogen rich exhaust".

Regarding claim 4, 8 and 16, note that an oxidant, such as oxygen, in tank 14 is added to the compressor output to assist combustion at high altitudes.

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Regarding claim 7, note that since the fuel is burned internally, as opposed to externally, such as in a steam turbine, where fuel is "burned" in a boiler or nuclear reactor, that the engine of Rae is an "internal combustion engine".

Regarding claims 10 and 15, note that the fuel is burned as a result of compression, as opposed to being ignited with a spark plug. Also regarding claim 10, see the 112 rejections of claim 10 as set forth in this Office Action.

19. Claims 1, 7, 12, 13 and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Houseman, US Patent 4,041,910.

Houseman teaches an extended rich mode engine having an intake and an exhaust, said extended rich mode engine configured to operate extremely rich of stoichiometric to produce a substantially continuous optimized (see comments below) hydrogen rich engine exhaust (from cylinders 10 and 11).

Regarding the term "optimized" in recited in claim 1, see the comments for this term in the above 102 rejection.

Regarding claim 13, note that the "choke valve" on the carburetor (20) of Houseman may be considered an "oxygen enrichment device", as opening of the choke valve "enriches" the oxygen supply to the engine.

Regarding claim 15, note that the engine of Houseman compresses the mixture before ignition.

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***Claim Rejections - 35 USC 103***

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Houseman, US Patent 4,041,910, in view of Houseman, et al, US Patent 3,982,910.

Houseman ('1910) teaches that an engine is operated in a fuel rich condition of an air fuel ratio of 7-11 to 1 (lines 54 and 55 of column 3), as opposed to an "optimum" or "stoichiometric" air fuel ratio of 14.65 to 1 (lines 21-24 of column 3). Houseman fails to teach that the combined concentration of hydrogen and carbon monoxide is greater than about 30% of the engine exhaust (line between cylinders 10 and 11 and carburetor 24) running in the fuel rich condition.

However, Houseman ('2910) teaches a gas generator that generates a hydrogen rich exhaust (abstract) that is utilized in a lean engine (91 – Figure 8) that has a concentration of carbon monoxide and hydrogen, by volume, at an air fuel ratio of 7:1 of approximately 38% (Figure 3 – by adding ordinate values for CO and H<sub>2</sub> at an abscissa value of 7). A hydrogen and carbon monoxide exhaust concentration by volume of greater than 30% is advantageous in that the hydrogen rich exhaust concentration percentages of Houseman '2910 may be used as fuel in the lean cylinders of Houseman '1910 to promote fuel efficiency and reduce emissions.

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a hydrogen rich exhaust with the concentration of hydrogen and carbon monoxide in excess of 30% in the hydrogen rich exhaust of Houseman '1910, as taught by Houseman '2910.

Regarding claim 3, note that Houseman '1910 teaches the use of an air fuel ratio of as low as 6.5 to allow an even richer hydrogen exhaust (lines 51-58 of column 4). From Figure 3 of Houseman '2910, an air/fuel ratio of 6.5 corresponds to a combined concentration of hydrogen and carbon monoxide of 44%. Note also that the claim 19 recitation of "about 50%" implies a tolerance. The Examiner then refers to case law to attempt to quantify this tolerance. Note that in a recent court decision, *In re Lance G. Peterson and Ioannis Vassitis* decided 1-8-2003 by the US Court of Appeals it was affirmed that a claim recitation of "about 14 percent chromium" is unpatentable over a prior art reference that teaches "12% chromium". From this, it is considered reasonable to assume that the "tolerance" may be quantified as:  $12/14 = .86$ , or plus or minus 14% of the stated values preceded by the word "about". From this, we see that the (+ or -) "tolerance" on the claim 19 recitation of "about 50%" is  $50\% \times .86$  and  $50\% \times 1.14$ . This results in the recitation of "about 50%" to mean from 43 to 57%. From this, it is seen that the combined concentration of hydrogen and carbon monoxide of an air/fuel ratio of 6.5 of Houseman '2910 of 44% is "greater" than the claim 19 recitation of "greater than about 50%", which is interpreted to mean, from case law, "greater than 43 to 57%".

***Allowable Subject Matter***

22. Claims 5, 6, 9, 14 and 17 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Examiner's Comments***

23. As noted in this Office Action, claims 18-25 are withdrawn from consideration as being drawn toward a non-elected species. Applicant should indicate this on any future amendments, as required by 37 CFR 1.121.

24. The objection to the abstract made in the last Office Action dated 11-10-2004 have been repeated in this Office Action, as it does not appear that Applicant addressed the objection to the abstract in the amendment dated 03-10-2005.

25. The amendment dated 03-10-2005 has resolved all specification objections made on the last Office Action, with the exception of the update of the "status" of the parent application 10/387,663. The Examiner understands that this information may still have been unavailable at the time of the writing of the amendment, but may soon become available.

26. The drawing objections made on the last Office Action have been repeated on this Office Action, as for most part, the Applicant did not address the drawing objections in the amendment dated 03-10-2005. The drawing amendment dated 03-10-2005 to amend Figure 1 to overcome one drawing objection made on the last Office action was not approved for reasons set forth on this Office Action.

While some of the drawing objections made in this Office Action may have been similar to drawing objections made in the parent application, and believed to have been discussed and possibly resolved, in one or more phone calls with Applicant's representative, possibly Marylou Lavoie, to complete the written prosecution history for this Instant application, it is necessary to explain in writing why the objections are improper, if that is the case. If the objection was identical to a previous drawing objection made in the parent application, the Applicant may refer to an amendment in the parent application for an explanation. Otherwise, the Applicant is required to respond in writing to all objections and rejections set forth by the Examiner in an Office Action.

27. The claim objections and 112 rejections made on the last Office Action were repeated on this Office Action, as Applicant did not appear to have addressed these objections and rejections on the amendment dated 03-10-2005.

28. In light of Applicant's comments in the amendment dated 03-10-2005, the 102 rejection of claims 1, 7, 12 and 15 as being anticipated by Hepburn is withdrawn. The Examiner agrees that the hydrogen rich exhaust of Hepburn is "transient" in nature, as opposed to being "continuous", as set forth as a limitation in claim 1.

29. In light of Applicant's comments in the amendment dated 03-10-2005, the double patenting rejection of claims 1-17 is withdrawn.

30. The Applicant has amended claim 1 to include the limitation that the hydrogen rich exhaust be "optimized". As previously noted in this Office Action, note that lines 8 and 9 of page 9 of the specification recites "The present system and method optimizes

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(increases) the hydrogen content of the engine exhaust". From this, the word "optimizes" is therefore understood to mean any increase in the hydrogen content of an exhaust above stoichiometric. Note this is consistent with a "hydrogen rich exhaust". Accordingly, the additional limitation of "optimized" in claim 1 does not patentably define over Rae or Houseman ('1910), as these prior art patents each teach a hydrogen rich exhaust.

31. The Applicant also traversed the rejection of claims utilizing Rae and Houseman ('1910) for other reasons in the "Remarks" section of the amendment dated 03-10-2005. Applicant's reason for traversal and the Examiner's comments follow:

a) On page 13 of the "Remarks section of the amendment dated 03-10-2005, regarding the 102 rejection utilizing "Rae", the Applicant recites "...Applicants note that Rae is a non-analogous art reference...".

**Examiner's Response:**

Firstly, it is not clear that Rae is non-analogous art, as both the Instant Application and Rae "deal with" hydrogen rich exhaust from an engine, though it is acknowledged that the Instant Invention is drawn toward a land vehicle engine, such as an automobile, while Rae is a jet engine for an airplane. However, this point is considered moot, as non-analogous art is only considered an "issue" for 103 rejections where "motivation to combine" is an issue. Rae was used to reject claims under 35 USC 102(b).

b) On page 14 of the "Remarks section of the amendment dated 03-10-2005, regarding the 102 rejection utilizing "Houseman", the Applicant recites "...With respect

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to the rejection based upon Houseman, neither Houseman reference teaches or suggest an extended rich mode engine configured to operate extremely rich of stoichiometric to produce a substantially continuous optimized hydrogen rich engine exhaust as presently disclosed and claimed where the hydrogen content of the engine exhaust is optimized (increased) to generate a very high hydrogen yield. Houseman discloses an arrangement for an internal combustion engine in which one or more of the cylinders of the engine are used for generating hydrogen rich gases from hydrocarbon fuels, which gases are then mixed with air and injected into the remaining cylinders in the same engine to be used as fuel...See Abstract of Houseman 1910...Houseman teaches a conventional engine with, for example, 6 cylinders, one or two of which are run somewhat rich and the others lean. A conventional engine is limited on how rich combustion can really be. The ratio of mass loads is fixed by the number of cylinders and the speed of the engine is coupled to torque.

Houseman teaches mixing a hydrocarbon fuel, such as gasoline, and air and injecting them into one or more cylinders of a conventional internal combustion engine. The pistons in the cylinders are permitted to compress the mixture of air and fuel. The amount of air mixed with the hydrocarbon fuel in a fuel rich carburetor is only sufficient to cause a partial oxidation of the fuel so that when the compressed mixture is ignited by a spark, it will not decompose, but rather is only partially oxidized to provide hydrogen and carbon monoxide principally. The resulting gas mixture, termed a hydrogen rich gas, is then mixed with air and injected into the remaining cylinders of the internal combustion engine to be ignited by the spark plugs and is used in the well

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known manner of fuel to power the engine. The engine is run lean and the lean carburetor may be fed gasoline when more power is required...See Houseman 1910 at Column 2, lines 34-68...Houseman shows a conventional engine where the realistic rich limit is about 9:1.”.

The present engines (of Applicant) are configured to produce a hydrogen rich exhaust and contemplate continuous production and dramatically different rich limits much beyond Houseman in hydrogen level of exhaust. The level of rich as achieved by the instant disclosure would cause rough running in the engine of Houseman. Normally, combustion near the rich limit of an internal combustion engine is very slow. The instant rich engine configurations with oxygen enrichment and/or rich homogeneous charge compression ignition, etc., enable combustion to be acceptably fast at much richer conditions than would otherwise be possible...”.

Examiner's Response:

The above discussion as best understood by the Examiner is a discussion largely between the differences of the disclosed inventions of Houseman ('1910 (for 102 and 103 rejections) and '2910 (for 103 rejections only)) and Applicant, as opposed to the differences between the claimed inventions of Applicant and the disclosed and inventions of Houseman. Specifically, the Examiner can find little, if any explicit discussion as to what specific limitations of what specific claims are not being met by Houseman.

From the above, it is best understood that Applicant is basically contending that Houseman does not operate “extremely rich of stoichiometric” which is best understood

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from claim 2 to be at least a combined concentration of hydrogen and carbon monoxide greater than about 30% by volume. However, claims 2 (engine exhaust having a combined concentration of hydrogen and carbon monoxide greater than about 30% by volume) and 3 (engine exhaust having a combined concentration of hydrogen and carbon monoxide greater than about 50% by volume) were rejected as being unpatentable over Houseman ('1910) in view of Houseman ('2910). Applicant did not appear to address this rejection in the above discussion, or elsewhere in the amendment.

### ***Conclusion***

32. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

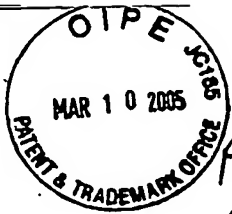
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33. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Bryan Fischmann whose telephone number is (571) 272-6694. The examiner can normally be reached on Monday through Friday from 9:00 to 5:30.

If attempts to reach the Examiner by telephone are unsuccessful, the examiner's supervisor, Chris Ellis, can be reached on (571) 272-6914. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, or by accessing the PAIR system.

 4-30-5  
BRYAN FISCHMANN  
PRIMARY EXAMINER



Proposed Drawing  
Correction to  
FIG. 1

1/2

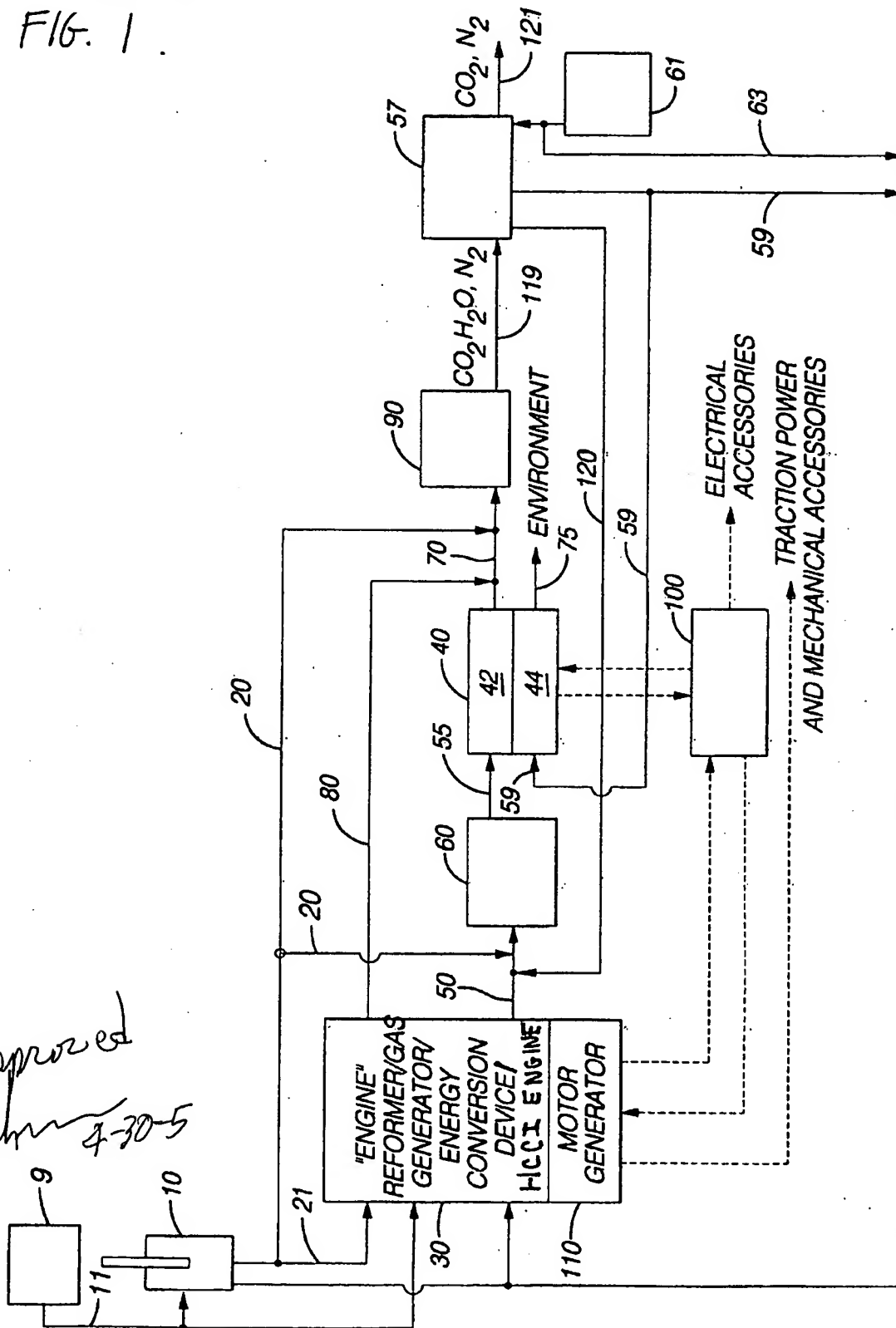


FIG. 1

not approved  
By *[Signature]* 4-30-5